



EPO Pesquet

POIWG

26-28 July 2016

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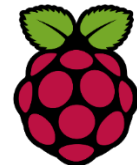
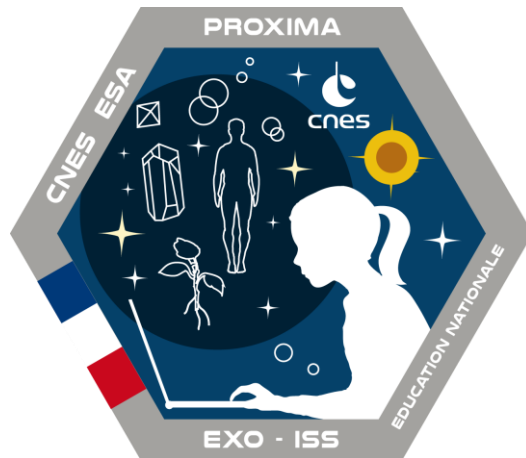
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Objectives of EPO Pesquet

- To strengthen and to encourage the teaching of science and thus stimulate the curiosity of students and motivate them towards further study of STEM (Science, Technology, Engineering, and Mathematics) and computing and coding subjects
- To primarily make the students aware that conditions on the ISS are different to those on earth and that in weightlessness, effects can be detected that are very hard to detect on Earth.



- **Educational Program Operations of Thomas Pesquet**
- **Joint project between CNES and ESA**

EXo- ISS

Description of Activities

- Ceres
- Cristal
- Cataliss
- EXo-ISS Kick-off Crew Message (Video)

Activities Flowchart

AstroPi 2.0

Description of Activities

- AstroPi 2.0
- AstroPi Kick-off and Congratulation Crew Message

Generic Videos and Travaux Pratiques 2

Description of Activities

- Travaux Pratiques 2
- Generic Videos



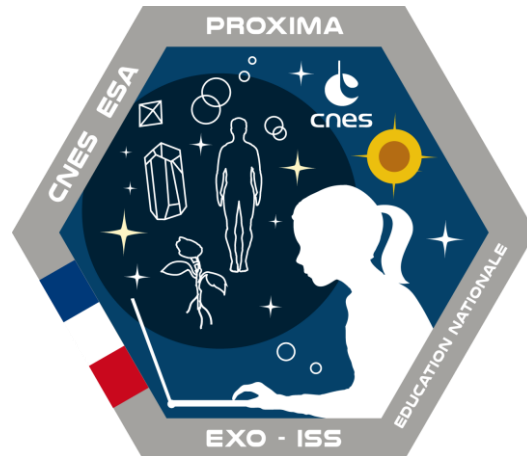
EPO Pesquet Pouch



AstroPi Vis
AstroPi IR



Exo-ISS: Ceres, Crisstal, Cataliss



- Upload vehicle: SpX- 10 for the EPO Pesquet Pouch

• Ceres

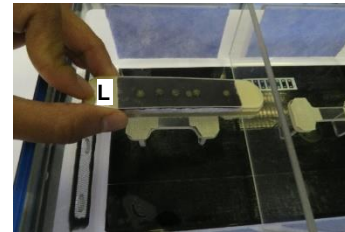
- Germination of Lentils, Mustard, and Radish in a greenhouse (Ceres Box).
- Installation in Columbus: The crew places the Seeds Support (three) in the Ceres Box and waters them.
- Photo-documentation of the plant growth during 10 days (Days 1, 2, 3, 4, 6, 8, 10)
- Re-watering shall be done if hygrometry is less than 60%

Purpose:

To demonstrate the influence of lack of gravity on the growth and germination of plants.



Ceres Box (L35 x W20 X H9 cm)



Installing the Ceres Seeds Support in the Ceres Box



Watering the Ceres Seeds Support (three) and viscose pads (six)



Ceres Seeds Support (3)



Ceres Syringe (3)

- **Ceres in Veggie**

- In work
- The crew will fasten the seed support structure (with seeds pre-assembled) into the Ceres Box. Place the Ceres Box inside Veggie
- Photo-documentation of the plant growth during 10 days (Days 1, 2, 3, 4, 6, 8, 10)



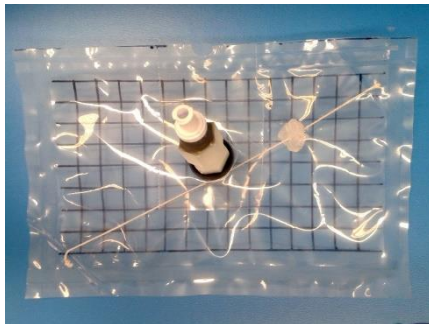
Key Point (In work): Operational testing for Ceres in Veggie GM

- **Crisstal**

- Crystal growth will be monitored within the Crisstal Salt Bag, a flexible bag uploaded with a seed crystal placed inside.
- The crew will prepare a saturated solution by adding 40 °C water (by mixing ambient and hot water) from the PWD to dissolve the Seignette salt already in Crisstal Syringe (three), then inject this solution to the Crisstal Salt Bag
- Photo-documentation of the crystal growth during 4 days (Days 1, 2, 3, 4)

Purpose:

To demonstrate the formation of crystals on orbit.



Crisstal Salt Bag



Crisstal Syringe



Drink Bag



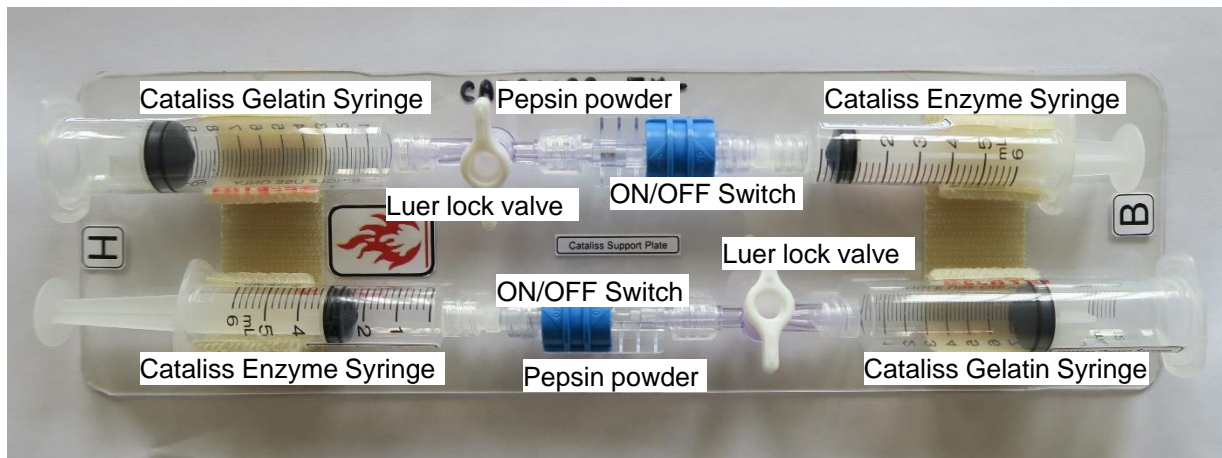
Crisstal Salt Bag inside the Crisstal External Bag, locked with the Crisstal Clip

• Cataliss

- Catalytic reaction will be exhibited via the Cataliss Support Plate, a plate uploaded with two sets of syringes assembled inversely, each set composing of 0.1 g enzyme powder (THL:0) and 3 ml of degassed Sprite (THL:0) to be injected in 7 ml of gelatin (THL: 0).
- The crew will slowly inject (~15s) the degassed Sprite into the gelatin, passing through the pepsin powder.
- Photo-documentation of the catalytic reaction during 3 days (Days 1, 2, 3)

Purpose:

To exhibit the impact of gravity (or the lack thereof) on catalytic reactions.

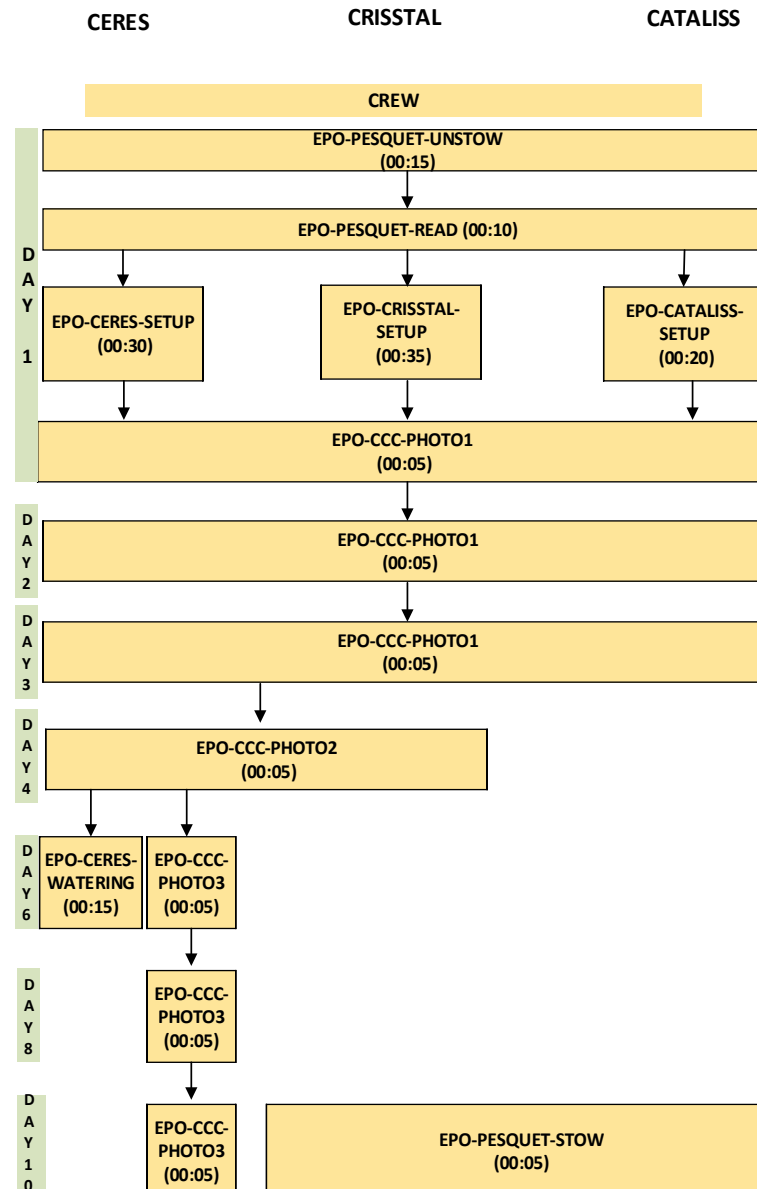


Cataliss Support Plate with the Cataliss Enzyme Syringes and the Cataliss Gelatin Syringes

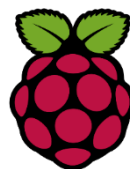


Cataliss Support Plate inside the Cataliss External Bag, locked with the Cataliss Clip

Activities Flowchart



AstroPi 2.0



- **AstroPi 2.0**
 - Joint endeavour between ESA Education, Raspberry Pi Foundation and CNES.
 - Continuation of EPO Peake AstroPi
 - Two AstroPi are on board: AstroPi Vis and AstroPi IR
 - JSL connectivity has been established for AstroPi Vis in COL
 - Facilitates up-/downlink of AstroPi program files and data
 - Three coding challenges with increasing complexity will be launched in Jan-16
 - French students will be asked to develop codes, which will be uplinked to the ISS



Key Point: Establish JSL connectivity for AstroPi IR in Node 2, in preparation for AstroPi 2.0:

→ Intention is to update the OS to operate it with ESA vLAN 95 socket/port in Node 2 and/or testing of WiFi dongle capability (if dongle available).

Generic Videos and Travaux Pratiques 2



CENTRE NATIONAL D'ÉTUDES SPATIALES



- **Generic Videos**

Eight recorded messages by ESA and CNES in support of the Proxima mission

1. Mission X – Kick-off
2. Mission X – Closing
3. Earth Guardian – Kick-off
4. Earth Guardian – Closing
5. Writing Contest
6. Human physiology and microgravity
7. French experiments valorisation
8. Life on the ISS

- **Travaux Pratiques 2**

- Follow up to the “EPO iriss DR Challenge” which generated a lot of interest during the iriss mission
- The competition is restricted to using only the crew member himself, and the current list of basic on-board items



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BIOTESC

Thank you for your attention.